

THE HABITS OF THE LONG-EARED BAT.

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THE habits of so familiar an animal as the Long-eared Bat (*Plecotus auritus*) ought by this time, one would think, to be too thoroughly known to need much further study; and I confess that I was a little disconcerted on learning in the summer of 1913 (towards the end of August) that a swarm of bats of this species was to be seen every night clustered together on the ceiling of a dark passage at Ballyhyland. I was in Dublin at the time, and could not personally investigate the matter; but having always regarded the Long-eared Bat as an all-night flier I felt my impressions rather badly knocked on the head by the intelligence that a multitude of these animals spent the early hours of every night clustering on the wall or ceiling of a dark indoor passage—where, moreover, they were never seen in the day-time.

The account given me was, however, perfectly correct, and the bats in question continued to frequent the passage in the same manner for at least seven years (1913 to 1919 inclusive)—except during the winter months, when they went elsewhere for hibernation. During the last five years of this period I had them under almost daily—if I may use such a word when I mean nightly—observation; and I now feel that I owe to the readers of the *Irish Naturalist* some qualification of the verdict, "All-Night Flier," which Dr. Alcock and I (as Tomes had done before us) returned on the Long-eared Bat in the article we contributed to this Journal¹ in December, 1901.

The inference that the Long-eared Bat flies all night was drawn by Tomes (Bell's "British Quadrupeds," 2nd ed., p. 75) from the fact that he was accustomed to hear its cry in the open fields at all hours of the night, and even in the darkest nights. To this Dr. Alcock and I were

¹ Vol. x., pp. 241-251.

able to add the further fact that we had seen and identified it on the wing, hunting moths, on the stroke of midnight and at 1.30 a.m. Such observations suffice, I think, to show that there is no hour of the night at which Long-eared Bats are not flying and taking prey. To that extent the habits of this species differ radically from those of the Hairy-armed Bat (*Nyctalus Leisleri*), which retires at the close of the evening twilight to the same sleeping apartment in which it has passed the day, and remains there until the approach of morning, when another brief flight is taken. However, it is one thing to fly at all hours of the night, and another thing to fly continuously throughout the night, as the Pipistrelle or Common Bat (*Pipistrellus pipistrellus*) seems to me to do, except during those brief intervals of rest which are necessitated by its capture of some insect too large to be comfortably disposed of during flight. From my five summers' observations on the Long-eared Bats in the passage at Ballyhyland, I am now convinced that each individual bat of that species spends a very considerable part of the night at rest—the rests varying in duration from half-an-hour to several hours, and the length of the period of flight being about equally elastic.

The hours during which the bats were to be seen on the walls of the passage in question varied according to the time of year, and, in some degree, to the state of the weather, the phases of the moon, and other causes too complicated to ascertain. In spring, when the nights were still fairly long, the assemblage would often have reached its largest dimensions by nine or ten in the evening, and have completely dispersed before twelve. In June and July the largest gatherings were generally seen about midnight, or perhaps an hour later. In August the bats again assembled early and broke up before midnight; but later on—especially after October set in—when the nights grew cold for insect hunting, it was not unusual for the bats to come in early and remain in their cluster the greater part of the night. I did not, however, ascertain at what o'clock on these chilly autumnal mornings they broke up and disappeared. The passage was never used as a sleeping place by day.

The presence of this assemblage in so convenient a spot as the passage leading from the main corridor to my bedroom was a great help towards ascertaining the periods of hibernation and activity, and also some particulars as to the breeding habits of these bats. They generally began to show themselves in the passage in some numbers before the end of March, and continued to do so well into November. In the four springs from 1916 to 1919 the earliest dates for seeing clusters of three or more were respectively March 30, March 24, March 19, and April 4. The latest dates in the four autumns from 1915 to 1918 were November 9, November 24, November 22, and November 24. Individual bats turned up in the passage in every winter month; but this was a very occasional occurrence, and I never saw two together on any night between the beginning of December and the end of February.

A fact of some importance ascertained by watching these bats was that their principal mating season is the spring—from the first week of April till about the middle of May.

This fact, of which it was easy to obtain convincing evidence on almost any evening of the period indicated, is not in agreement with the conclusion arrived at for bats in general by the two continental zoologists—Messrs. R. Rollinat and E. L. Trouessart—whose memoir¹ is pronounced by Major Barrett-Hamilton the most complete treatise bearing on the breeding habits of these mammals. These high authorities—for whose conclusions I am indebted to the summary of their memoir in Barrett-Hamilton's "History of British Mammals"²—find that the pairing of bats is almost exclusively an autumnal function, and that though occasional acts of mating take place in winter during intervals of interrupted hibernation, there is never any pairing in spring.

¹ "Sur la reproduction des Chauves-Souris." *Mém. Soc. Zool. de France*, ix., pp. 214-240, 1896.

² Vol. i., pp. 32-4.

These results, however, appear to have been arrived at by the actual study of only three species—the Mouse-coloured (*Vespertilio murinus*) and the Greater and Lesser Horse-shoe Bats (*Rhinolophus ferrum-equinum* and *R. hipposideros*)—of which only the last-named is found in Ireland. As regards those bats that are familiar to British observers, the absence of spring coupling is strongly doubted by several of our best authorities, as, for instance, by Mr. Arthur Whitaker, who thinks that the manner in which Pipistrelles chase one another in spring is only consistent with amorous propensities,¹ and by Mr. T. W. Proger, who draws similar conclusions from the conduct of the Lesser Horse-shoe Bat as observed by him in Wales.² Major Barrett-Hamilton's conclusion is that the matter deserves further study, and that the verdict of MM. Rollinat and Trouessart, "in view of the condition of the male, is so surprising as to seem in need of corroboration."

Be the facts as they may regarding the Pipistrelle and the Lesser Horse-shoe, the conduct of the Long-eared Bats in the passage at Ballyhyland left no room for doubt that in the case of that species coupling takes place systematically and on a large scale when the bats come in to rest of a spring night. It was not unusual to see three or four cases of pairing simultaneously in progress within the distance of little more than a yard along the passage wall. By pretty careful watching I ascertained that autumnal coupling also occurs, but only on quite a small scale; and the repetition of the procedure in four consecutive years made it clear beyond question that spring is, in that locality, the chief mating season of the species. The time when pairing seemed to be at its height varied from about April 18th (in 1917) to about May 3rd (in 1916). The earliest and latest dates at which it was seen in spring were April 5th and May 28th; in autumn, October 16th and November 29th. This last date would doubtless be an instance of coupling during interrupted hibernation.

¹ *Naturalist*, 1905, pp. 325-330.

² *Proc. Cardiff Nat. Soc.*, March, 1905.

That the winter sleep of the Long-eared Bat is frequently interrupted has been proved by many observers, and particulars of one individual's repeated changes of residence during the winter months were given by Dr. Alcock and myself in the article already referred to.¹ I therefore think it well to give here an instance to the contrary, which one of the bats of the congregation now under notice was good enough to offer me in the winter of 1918-9. It very kindly chose for its place of hibernation a corner of the same passage that had formed the nocturnal resting-place of the crowd in summer. I thus had it in full view every day and night from the beginning to the end of its occupancy. During the first fortnight of December, being still only in the incipient stage of its hibernation, it used to fly for short periods (sometimes two or three hours) on warm evenings; but from December 15th to March 26th it never once moved, although there were several nights when the temperature in the open was as high as 48°, and one (December 28th) when it stood at 50°. This bat, therefore, enjoyed an uninterrupted winter-sleep of 101 days.

During summer, as might be expected, the floor of the passage was strewn with large numbers of wings of the various moths on which the bats had been feeding. A list of these would not add much to our knowledge of the Long-eared Bat's taste in edibles. I was indebted, however, to the animals for the welcome information that the Copper Underwing Moth (*Amphipyra pyramidea*)—not hitherto, so far as I know, recorded for Co. Wexford—occurs at Ballyhyland, since its wings were dropped on several occasions. Other interesting moths brought in were the Peach-blossom (*Thyatira batis*) and its congener *T. derasa*, the Burnished Brass (*Plusia chrysitis*), the Tiger Moth (*Arctia caia*), whose brilliant colours do not appear to possess a warning value, and the Shark Moth (*Cucullia umbratica*), which interested me from the fact that the bats seemed never to bring it in in the earlier half of the night, as I frequently searched the floor after midnight without ever finding this species,

¹ *Irish Nat.* vol. x., pp. 245-7.

though its wings were of frequent occurrence in the mornings. Wings of the Silver Y (*Plusia gamma*) and its relative *P. pulchrina* were sometimes scattered in such abundance as to outnumber all the other kinds ; but this was only when the rhododendrons round the house were in flower, and as the flowers of these shrubs were much frequented by both the Plusias during and after dusk I have little doubt that the bats hunted among the blossoms and caught the moths at rest drinking nectar.

As another mark of the Long-eared Bat's predilection for taking insects at rest I may mention the conspicuous absence under their bivouac of the wings of the well-known Ghost-Moth (*Hepialus humuli*). That this moth is a favourite prey of some very common bat is proved by the large numbers of its wings that are commonly found on roads ; but as it is much more easily found on the wing than at rest we can understand its falling a readier prey to those bats that chiefly hunt flying insects than to those that, like the Long-eared Bat, seek for sedentary victims.

The extremely common White Ermine Moth (*Spilosoma menthastri*), which is disliked but not invariably rejected by bats, was so rarely carried into the house by my long-eared friends that during my five summers' observations I only once found its wings on the passage-floor. Of decidedly more frequent occurrence were those of the Buff Ermine (*S. lubricipeda*), which I found every year, though this is undoubtedly much the less numerous species in the district. The less conspicuous colours of the Buff Ermine would, I think, suggest that its flavour is probably somewhat less unpalatable than that of *S. menthastri*, and the treatment of both species by the Long-eared Bats would seem to point to the same conclusion ; though Mr. Oldham's important observations on the feeding habits of the Noctule¹ have made it perfectly clear that some degree of unpalatability is possessed by both these moths.

¹ Zoologist, 1901, pp. 51-9.

It is a little remarkable that Mr. O. V. Aplin (who seems to have studied the Long-eared Bat's feeding habits in a similar nocturnal retreat to that frequented at Ballyhyland, though he regarded it simply as a "dining-hall" of the animals) also includes the Buff Ermine, without mentioning the White, among the moths whose wings were dropped by the diners.¹ The White Ermine is, however, to my knowledge sometimes eaten in large numbers by bats whose species I have failed to ascertain, and who are probably less fastidious than the Long-eared kind.

The only non-lepidopterous insect whose wings I found on the passage floor was the large spotted crane-fly *Tipula gigantea*, which was also noticed by Mr. Aplin as preyed on by his bats in Oxfordshire. Very small wings would, in any case, escape notice, and many such are certainly crunched up and swallowed with their possessors.

Before closing I should state that when hours are mentioned in this paper I have not followed any of the changes that have been made in our statutory time since the summer of 1915. "Summer Time" (introduced in 1916) was, of course, never intended to be followed in scientific notes; and the change from Irish to Greenwich time, coming later, would, if followed, introduce further complications into a comparison between notes taken before and notes taken after the change. I prefer, therefore, in all records of natural history observations in which hours have to be mentioned, to adhere to old Irish time, and use the term "12 o'clock" (instead of 1.25 a.m.) for the true middle of a summer night.

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¹ *Zool.*, 1889, p. 382.